BELOUSOV, P.I., starshiy nauchnyy sotrudnik

Methods for determining the terminal supportive capacity of amputation stumps. Ortop.travm. i protez. 20 no.7:68-72 Jl '59. (MIRA 12:10)

1. Iz Leningradskogo nauchno-issledovatel'skogo instituta protezirovaniya (dir. - dotsent M.V.Strukov).
(AMPUTATION STUMPS)

BELOUSOV, P.I., doktor med.nauk

Methods for the training and functional evaluation of the forearm stumps following their splitting by the Krukenberg technic. Ortop., travm.i protez. no.5:22-28 '61.

(MIRA 14:8)

1. Iz Leningradskogo nauchno-issledovatel'skogo instituta protezirovaniya (dir. - dotsent M.V. Strukov).
(AMPUTATION STUMPS)

KOPYLOV, F.A., prof.; BELOUSOV, P.I., doktor med.nauk; PEVZNER, M.S., doktor med.nauk

Clinics for the application of prosheses. Ortop.travm.i protez. 22 no.4:50-54 Ap '61. (MIRA 14:11)

1. Iz Leningradskogo nauchno-issledovatel'skogo instituta protezirovaniya (dir. - dotsent M.V. Strukov). Adres avtorov: Leningrad, prosp. Karla Marksa, d.9, Institut protezirovaniya.
(REHABILITATION CENTERS) (PROSTHESIS)

BELOUSOV, P.I., doktor med.nauk (Leningrad, F-126, ul. Marata, d.75, kv.38)

Prospects for increasing sensitivity in prosthetics. Ortop., travm.i protez. no.4:25-27 '62. (MIRA 15:5)

1. Iz Leningradskogo instituta protezirovaniya (dir. - dotsent M.V. Strukov).

(ARTIFICIAL LIMBS)

BELOUSOV, Pavel Il'ich; STUPKINA, Nadezhda Vasil'yevna; UDERMAN, Sh.I., red.; KHARASH, G.A., tekhn. red.

[Instruction in the use of artificial extremities] Obuchenie pol'zovaniiu iskusstvennymi konechnostiami; metodicheskoe rukovodstvo. 2. izd., dop. i perer. Leningrad, Medgiz, 1963. 150 p. (MIRA 16:5)

(ARTIFICIAL LIMBS)

APPROVED FOR RELEASE: 06/23/11: CIA-RDP86-00513R000204400030-6

BELOUSOV, P.I., doktor med.nauk (Leningrad F-126,ul.Marata,d.75,kv.38)

Sports after an amputation. Ortop., travm.i protez. 23 no.11: 72-75 N '62. (MIRA 16:4)

1. Iz Leningradskogo instituta protezirovaniya (dir. - dotsent M.V.Strukov).

(AMPUTEES) (SPORTS—PSYCHOLOGICAL ASPECTS)

BELOUSOV, Pavel Il'ich; BORTFEL'D, S.A., red.

[Exercise therapy for the prevention and elimination of postamputation contractures] Lechebnaia gimnastika dlia profilaktiki i ustraneniia posleamputatsionnykh kontraktur. Leningrad, Meditsina, 1965. 106 p. (MIRA 18:3)

BELOUSOV, P.N.

With devotion to the assigned task. Avtom., telem. i sviaz' 7 no.12:21-22 D '63. (MIRA 17:4)

1. Starshiy elektromekhanik Leningrad-Finlyandskoy distantsii signalizatsii i svyazi Oktyabr'skoy dorogi.

BELOUSOV, P. T.

"D.A.Zavalishin, Soviet Scientist," by P.T.Belousov, V.M.Rokotyan, K. I. Pyartman, and I.A.Safronov. Elektrichestvo, No 8, p. 91, 1950.

W-22909, 27 May 52

BELOUSOV, R.

Improve planning in river transportation. Rech. transp. 22 no.8:1-2 Ag '63. (MIRA 16:10)

1. Chlen kollegii Ministerstva rechnogo flota.
(Inland water transportation)

BELOUSOV, Rem Aleksandrovich, GERTSOVICH, G., red.; SMIRNOV, tekhn.red.

[Growth of heavy industry in the German Democratic Republic] Razvitie tiazheloi promyshlennosti v Germanskoi Demokraticheskoi Respublike. Moskva, Gos. izd-vo polit. lit-ry, 1958. 134 p. (MIRA 11:8)
(Germany, East--Industries)

APPROVED FOR RELEASE: 06/23/11: CIA-RDP86-00513R000204400030-6

BELOUSOV, Rem Aleksandrovich

[Decisive stage] Reshaiushchii etap. Moskva, Izd-vo In-ta mezhdunar.otnoshenii, 1959. 55 p. (MIRA 13:4)
(Russia--Economic policy)

BELOUSOV, R.A., kand. ekonom. nauk; KRYLOV, P.N., kand. ekonom. nauk; LEMESHEV, M.Ya., kand. sel'khoz. nauk; IVANOV, Ye.A., nauchnyy sotr.; KOSTAKOV, V.G., kand. ekonom. nauk; BOGOMOLOV, O.T., kand. ekonom. nauk; YEFIMOV, A.N., prof., doktor ekonom. nauk, red.; KOMINA, Ye., red.; KOROLEVA, A., mladshiy red.; ULANOVA, L., tekhn. red.

[Economy of the U.S.S.R. in the postwar period; concise economic survey] Ekonomika SSSR v poslevoennyi period; kratkii ekonomicheskii obzor. Moskva, Izd-vo sotsial'no-ekon. lit-ry, 1962. 486 p. (MIRA 15:2)

1. Nauchno-issledovatel'skiy ekonomicheskiy institut Gosudarstvennogo ekonomicheskogo soveta SSSR (for Belousov, Krylov, Lemeshev, Ivanov, Kostakov,Bogomolov). 2. Direktor Nauchno-issoedovatel'skogo ekonomicheskogo instituta Gosudarstvennogo ekonomichesko soveta SSSR (for Yefimov).

(Russia--Economic conditions)

BELOUSOV, Rem Aleksandrovich, kand. ekon. nauk; GLYAZER, L.S., red.

[Ways to improve the system of planning prices] Puti sovershenstvovaniia sistemy planovogo tsenoobrazovaniia. Moskva, Ekonomika, 1964. 55 p. (Obsuzhdaem problemy sovershenstvovaniia planirovaniia, no.6) (MIRA 18:3)

1. Zaveduyushchiy sektorom tsenoobrazovaniya Gosudarstvennogo nauchno-issledovatel'skogo ekonomicheskogo instituta Gosplana SSSR (for Belousov).

BELOUSOV, R.I.

Towards the June Plenum of the CPSU. Rech.transp. 18 no.6:1-2
Je '59. (MIRA 12:9)
(Inland water transportation)

SHUSTROV Dmitriy Nikiforovich; SUKOLENOV, Aleksandr Yevdokimovich; [redacted]nzent; SVIRIDOV, A.A., red.; MAKRUSHINA, A.N., red. izd-va; BODROVA, V.A., tekhn. red.

[Modern methods of work organization in river transportation] Sovremennye metody organizatsii raboty rechnogo transporta. Moskva, Izd-vo "Rechnoi transport," 1961. 88 p. (MIRA 15:4)

(Inland water transportation) (Industrial organization)

APPROVED FOR RELEASE: 06/23/11: CIA-RDP86-00513R000204400030-6

BELOUSOV, Roman Iosifovich

[River transportation costs and the ways to reduce them] Sebestoimost' produktsii na rechnom transporte i puti ee snizheniia. Moskva, Rechnoi transport, 1961. 61 p. (MIRA 15:10)

(Inland navigation)

BELOUSOV, S.

VINNIKOV, I.F.; DOROVSKOY, V.Ye; PUZACHEV, S.I.; OL'KHOVOY, V.; BELOUSOV, S.

[Our work experience] Nash opyt raboty. Moskva, Ugletekhizdat, 1953. 31 p. (MLRA 7:1)

1. Mashinist kombayna shakhty imeni S.M.Kirova tresta Nesvetayantratsit kombinata Rostovugol' (for Vinnikov). 2. Mashinist kombayna shakhty "Oktyabr'skaya revolyutsiya" tresta Shakhtantratsit, master uglya (for Puzachev). 3. Prokhodchik shakhty imeni Vorovskogo tresta Shakhtantratsit, Pochetnyy shakhter (for Dorovskoy). 4. Mashinist vrubovoy mashiny shakhty "Novo-Azovskaya" tresta Shakhtantratsit, master uglya (for Ol'khovoy). 5. Perenoschik konveyera shakhty "Komsomol'skaya pravda" tresta Shakhtantratsit, Pochetnyy shakhter (for Belousov).
(Coal mines and mining)

BELOUSOV, .A.

In the Presidium [illegible] the U.S.S.R.
Izv.vost.fil.AN SSSR [illegible] (MIRA 10:0)
(Academy of [illegible] U.S.S.R.)

S/081/62/000/023/046/120
B166/B101

AUTHOR: Belousov, S. A.

TITLE: Automatic pulsed weighing batcher system

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 23, 1962, 397, abstract 23I204 (Vestn. tekhn. i ekon. inform. N.-i in-t tekhn.-ekon. issled. Gos. kom-ta Sov. Min. SSSR po khimii, no. 11, 1961, 27-32)

TEXT: After a review of existing Soviet and foreign systems the article describes the AISVD method developed by VNIIATI (In-t asbestovykh tekhnich. izdeliy - All-Union Scientific Research Institute of Asbestos Articles) intended for making automatic scales based on standard dial-type measuring devices, e.g. the ЦУ-500 (TsU-500). The system comprises: a pulse generator, a selection unit, weighing units according to the number of components to be batched, and final control elements. When material arrives in the scales pan a perforated disk with three rows of holes connected to a pointer rotates, and by interrupting in succession three beams of light to phototriodes it gives pulses which are counted by counters in the

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Automatic pulsed weighing... S/081/62/000/023/046/120
B166/B101

weighing blocks. When a particular weight as set on the counter is reached the supply of material is stopped, the selection unit cuts in the next weighing unit, and weighing of the next component commences. [Abstracter's note: Complete translation.]

Card 2/2

BELOUSOV, S.A.

Automation of the proportioning of rubber compound components.
Kauch. i rez. 22 no.12:22-24 D '63. (MIRA 17:9)

1. Vsesoyuznyy nauchno-issledovatel'skiy i konstruktorsko-tekhnologicheskiy institut asbestovykh tekhnicheskikh izdeliy, Yaroslavl'.

BELOUSOV, S.A., inzh.

Automatic proportioning of components and feeding of mixing units. Mekh. i avtom. proizv. 19 no.8:22-24 Ag '65.

(MIRA 18:9)

BELOUSOV, S. L.

USSR/Astronomy - Photosphere, Solar 11 Aug 51

"Applicability of Kirchhoff's Law to the Photosphere of the Sun and Class-A0 Stars," S. L. Belousov

"Dok Ak Nauk SSSR" Vol LXXIX, No 5, pp 763-766

Acknowledges the interest and help of Prof E. R. Mustel' and I. S. Shklovskiy, Dr of Math Phys. Evaluates the possible magnitude of the deviation of T_K from T for the Sun's revolving layer, where T is the radiation temp and T_K is the kinetic temp of free electrons. Submitted by Acad G. A. Shayn 19 Jun 51.

210T2

ILLEGIBLE

APPROVED FOR RELEASE: 06/23/11: CIA-RDP86-00513R000204400030-6

BELOUSOV, S.L.

SUBJECT USSR/MATHEMATICS/Applied mathematics CARD 1/1 PG - 614
AUTHOR BELOUSOV S.L.
TITLE Tables of the normalized associated Legendre polynomials.
PERIODICAL Moscow: Publication of the Academy of Science of the USSR (Energetic G.M.Kržižanovskij-Institute) 380 p. (1956) reviewed 2/1957

The table contains the function values of the polynomials

$$\overline{P}_n^{\,m}(\cos\theta) = \sqrt{\frac{2n+1}{2}\,\frac{(n-m)!}{(n+m)!}}\; P_n^m(\cos\theta)$$

with

$$P_n^m(\cos\theta) = (\sin\theta)^m \,\frac{d^m P_n(\cos\theta)}{d(\cos\theta)^m}$$

computed for six decimals. $P_n(x)$ is the ordinary Legendre polynomial. The normalization is chosen such that $\int_{-1}^{+1}(\overline{P}_n^{\,m}(x))^2 dx = 1$. The table contains the region $0 \leq m \leq 36$, $m \leq n \leq 56$; the interval for θ is $2{,}5^\circ$. In the introduction some formulas and a short explanation on the computation of the function values can be found.

BELOUSOV, S. L.

USSR/Physics of the Atmosphere - Dynamic Meteorology, M-2

Abst Journal: Referat Zhur - Fizika, No 12, 1956, 36115

Author: Kashin, [illegible] I., Belousov, S. L.

Institution: None

Title: Weather Forecasting

Original Periodical: Nauka i zhizn', 1956, No 5, 40-42

Abstract: Popular discussion of the physical-mathematical method of investigating atmospheric processes and on the value of mathematical computers for weather prediction.

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APPROVED FOR RELEASE: 06/23/11: CIA-RDP86-00513R000204400030-6

BELOUSOV, S. L. Cand Phys-Math Sci -- (diss) "Solution of certain ~~Solving Some~~ Problems in ~~of~~ the Short-Term Forecasting of Meteorological Elements by Means of High-Speed Computer Machines." Mos, 1957. 5 pp 20 cm. (Central Inst of Forecasts), 100 copies (KL, 17-57, 94)

BELOUSOV, S.L.

KIBEL', Il'ya Afanas'yevich; BELOUSOV, S.L., red.; BYKOV, V.V., red.; KOLESNIKOVA, A.P., tekhn.red.

[Introduction to hydrodynamic methods of short range weather forecasting] Vvedenie v gidrodinamicheskie metody kratkosrochnogo prognoza pgody. Moskva, Gos. izd-vo tekhniko-teoret. lit-ry, 1957. 375 p. (MIRA 11:4)

(Weather forecasting)

BELOUSOV, S.L.

Precalculating the pressure for vaious altitudes of the atmosphere.
Meteor. i gidrol. no.9:15-19 S '57. (MLRA 10:9)
(Atmospheric pressure)

BELOUSOV, S.L.

International conference on numerical methods of prognoses. Meteor. i gidrol. no.9:58-59 S '57. (MLRA 10:9)
(Stockholm--Weather forecasting--Congresses)

BELOUSOV, S. L.

49-9-5/13

AUTHORS: Belousov, S. L. and Bykov, V. V.

TITLE: On taking into consideration the influence of mountains in forecasting the baric field. (Ob uchete vliyaniya gor pri prognoze baricheskogo polya).

PERIODICAL: Izvestiya Akademii Nauk SSSR, Seriya Geofizicheskaya, 1957, No.9, pp.1142-1153 + 3 plates (USSR)

ABSTRACT: An important drawback of available methods of numerical forecasting based on the single layer model of the atmosphere is due to the fact that vertical movements are not taken into consideration. One of the possible methods of improving the accuracy and the effectiveness of the forecasting at the medium level of the atmosphere by means of high speed computers consists in taking into consideration the influence of vertical movements caused by the presence of non-uniformities on the Earth's surface and, particularly, of large mountain ranges. In spite of the fact that the forced air circulation takes place for specific forms of the circulation and are limited to certain geographical regions, their influence on the atmospheric processes is very considerable in numerous cases. One of the authors showed in an earlier paper (Ref.1) that in forecasting the geopotential at the

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On taking into consideration the influence of mountains in forecasting the baric field.

average level of the atmosphere it is possible to take into consideration the influence of mountain ranges on the air currents; the formulation of the problem is briefly recapitulated, mentioning that a non-linear equation, eq.(7), p.1144, was derived for forecasting the geopotential at the average level of the atmosphere in which the influence of mountain ranges are taken into consideration. In this paper a numerical solution of this equation is arrived at which is free from some of the limiting assumptions made in the earlier paper. For the numerical solution the finite difference method of solving the Poisson equation is used which ensures taking into consideration the dispersion of waves of the baric field. The author deals with the scheme of the numerical solution of the eq.(7) re-written as shown in eqs. (8) and (9), p.1145, and also with certain features of the programming of this problem for the computer БЭСМ. As initial data in the numerical calculation of the system of equations (8) and (9), the data are used pertaining to the altitude AT 700 above the territory for which the height forecasting chart is compiled. These data are given in the nodes of a

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On taking into consideration the influence of mountains in forecasting the baric field. 49-9-5/13

rectangular grid, Fig.3, containing 480 points, the grid spacings are 250 km. The obtained solution is applicable to universal electronic computers and, as an example, a 24 hour forecasting chart is calculated for May 18, 1956 comparing the results obtained by taking into consideration the Scandinavian mountains and by not taking these into consideration. The obtained results indicate that it is possible to calculate more accurately the geopotential at the medium level by taking into consideration the orographic influences within the framework of the single layer model of the atmosphere. Acknowledgments are made to I.A.Kibel on whose initiative the here described work was carried out. There are 11 figures and 3 Slavic references.

SUBMITTED: January 12, 1957.

ASSOCIATION: Central (Weather) Forecasting Institute. (Tsentral'nyy Institut Prognozov).

AVAILABLE: Library of Congress

Card 3/3

28357 S/124/61/000/007/029/044
A052/A101

3,5000

AUTHOR: Belousov, S. L.

TITLE: A short-term pressure forecast by means of high-speed computers

PERIODICAL: Referativnyy zhurnal, Mekhanika, no. 7, 1961, 86-87, abstract 7B571 ("Tr. Tsentr. in-ta prognozov," no. 60, 1957, 10-16)

TEXT: A scheme of solution of a system of differential equations by means of computers is suggested with the purpose of precalculating the geopotential height of 700 millibars. The equations on the assumption of quasigeostrophicity have the form

$$\Delta \frac{\partial \varphi}{\partial t} - l^2 \frac{\partial \tau}{\partial p} = -\frac{1}{l} (\varphi \cdot \Delta \varphi) - \beta \frac{\partial \varphi}{\partial t}$$

$$\frac{\partial^2 \varphi}{\partial p \partial t} + \frac{c^2}{p^2} = \frac{1}{l} \left(\frac{\partial \varphi}{\partial p}, \varphi\right)$$

where x, y are coordinates, t - time, p - pressure. The sought for functions are geopotential φ and vertical velocity τ. The problem is solved for a limited territory on a "flat" land, the Koriolis parameter l and $\beta = \partial c/\partial y$ are assumed

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28357

to be constant. Parameter c is constant and has the dimensionality of velocity. The Euler method (the solution of the problem by steps in time and coordinates) is used for a certain rectangular region at the correspondingly assigned boundary and initial conditions, for determining the future values of geopotential in the nodes of the network superimposed on this region. The network consists of 22 x 18 nodes, a step along the horizontal is 250 km. It is assumed that during a short time interval the change of the geopotential at a given point is determined by just a small region surrounding this point (in practice by nine close-by nodes of the network). The correctness of selection of the space step of the network and of the time step has been checked by applying the selected calculation scheme to a some particular kind of the initial field for which an analytical solution is available. It has been found that at the mentioned step of the network the time step should be 1.5 hours, and the small fluctuations of the field emerging thereby can be eliminated by the additional intermediate smoothing of the field. An investigation of the effect of artificial boundary conditions has shown, that after 16 time steps the computed values of geopotential are not reliable at the points of the 3 extreme rows of the network for which calculations have been made. The results of the test forecast examples cited in the article warrant a conclusion that the discussed calculation scheme can be used for practical forecasts.

[Abstracter's note: Complete translation] A. Chaplygina

BELOUSOV S. L.

3(7) PHASE I BOOK EXPLOITATION SOV/2115

Tsentral'nyy institut prognozov

Voprosy dinamicheskoy meteorologii (Problems of Dynamic Meteorology) Moscow, Gidrometeoizdat (Otd-niye), 1958. 110 p. (Series: Its: Trudy, vyp. 78) 1,300 copies printed.

Sponsoring Agency: USSR. Glavnoye upravleniye gidrometeorologicheskoy sluzhby.

Resp. Ed.: Ya. M. Kheyfets; Ed.: Yu. V. Vlasova; Tech. Ed.: I.M. Zarkh.

PURPOSE: This collection of articles is intended for research workers in dynamic meteorology. It may also be of interest to advanced students in the field.

COVERAGE: These articles deal with hydrodynamic methods of a short-range forecasting of meteorologic elements, the theory of climate,

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and questions of general atmospheric circulation. The article by by S.A. Mashkovich discusses the formation and retention of zonal circulation heat under the influence of the incoming solar heat for given albedo values of the earth's surface. Ye.M. Dobryshman presents a linear theory for long-term humidity forecasting. S.L. Belousov explains the errors occuring in solving forecasting problems for a mean atmospheric level by replacing differential equations with difference equations. V.V. Bykov offers a solution of the spatial problem in forecasting meteorologic elements assuming quasi-solenoidal motion. V.P. Sadokov presents a forecasting method (a spatial problem) adapted for a fast electronic computer. There are 47 references: 30 Soviet, 13 English, and 4 German.

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Problems of Dynamic Meteorology SOV/2115

AVAILABLE: Library of Congress

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MM/bg
8-13-59

AUTHOR: Belousov, S.L. SOV/49-58-9-13/14

TITLE: Evaluation of Errors When Solving the Equation for Eddies Transfer by a Method of Successive Approximation (Ob otsenke oshibok approksimatsii pri reshenii uravneniya perenosa vikhrya metodom posledovatel'nykh priblizheniy)

PERIODICAL: Izvestiya Akademii Nauk SSSR, Seriya Geofizicheskaya, 1958, Nr 9, pp 1145 - 1150 (USSR)

ABSTRACT: The error of differencing can be determined in the evaluation of the eddy transfer equation provided that an assumption is made that the Poisson equation can be numerically solved by a more general method such as a method of successive approximation. An essential condition is that the geopotential field be represented in a form of one wave and the magnitude of error be defined as a difference between values of the differential and the corresponding difference equations.

The error of differencing is found from the Poisson difference equation (1) - the right part of which represents one wave while the left part (2) is the Laplace operator. Its solution can be written as (3) which is transposed into Eq.(8) by the operations (4) to (7).

The above can be applied for the determination of the error of the numerical solution of the Eq.(9) that describes the eddies transfer in the atmosphere. The exact solution of

of this equation will take the form (11) with the conditions (10) and (12). The difference equation corresponding to (9) will be (13) which can be written as Eq.(14) when differentiated in respect of time t. In this case, an exact solution will be Eqs.(15),(16). From the Poisson equation (13), the value of z is found as Eqs.(17), (18) and (19). The latter being an exact solution of (13). This equation can be substituted by (11) of the differential equation (9).
It should be noted that the amplitude:

$$D(\sqrt{1 + q^2})^n$$

in Eq.(19) increases with time while it remains constant in (11). An increase depends on the intervals τ and s and can be calculated as Eqs.(20) and (21). The value of (19) can be made to be equal to (11) if the amplitude is considered with the error of differencing, e.g. when $s = 250$ km, $\mu = \gamma = 2\pi/4\,000$ km, $c = 10.2$ m/sec, $\tau = t/n = 1.5$ h, the corresponding increase of amplitude

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Evaluation of Errors When Solving the Equation for Eddies Transfer by a Method of Successive Approximation

$(D_n - D_0)/D_0$ in one day ($t = 24$ hours) becomes 0.04. In this case, $q \approx 0.128$ but if the accuracy is taken as 0.8×10^{-3} it can be calculated that n/μ arc tg $q =$ $= n/\mu\ q = 0.91$ degs. Therefore, the velocity of wave travel in Eq.(9) represents 91% of the actual velocity calculated from the formula (4).
The value of the error can be found from the formula (3). In this case, the solution (19) should be substituted by (22), (23). The error expressed in terms of amplitude is defined by Eqs.(24), (25). In the example given above, $(D_n - D_0)/D_0 = 0.0521$; thus the displacement of waves differs by 0.9206 from the actual one.
The Poisson equation (13) is solved at every step by the method of successive approximation. It can be seen from the formula (8) that the phase of wave as determined by this method differs from the phase of the right part of the equation. The formulae (26) to (28) can be applied for the initial step while (29) and (30) can be used for

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the next and n steps. The values of D_k, R_k, ξ_k and ζ_k are found from the formula (31) for Eq.(34). These can be simplified and written as Eqs.(35) and (36) in the case of D_n differing from its exact value, i.e. in the case of the Poisson equation solved by (3).
The amplitude can be decreased if $\varepsilon_0 \neq 0$ and D_{k+1}/D_k is less than one. The decrease is inversely proportional to the value of ε_0. The table shows some results calculated from the formulae (31) to (34) for $\varepsilon_0 \neq 0$. It can be seen that the absolute value of differences, as compared with those for $\varepsilon_0 = 0$ are not greater than the magnitude of error determined by $\varkappa$. Therefore, these differences can be made as small as possible.

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Evaluation of Errors When Solving the Equation for Eddies Transfer by a Method of Successive Approximation

There is 1 Soviet reference.

ASSOCIATION: Tsentral'nyy institut prognozov (Central Forecasting Institute)

SUBMITTED: October 22, 1957

Card 5/5

APPROVED FOR RELEASE: 06/23/11: CIA-RDP86-00513R000204400030-6

AUTHOR: Belousov, S. L. SOV/50-58-11-1/25

TITLE: On the Predetermination of Pressure in the Medium Troposphere of the Northern Hemisphere (O predvychislenii davleniya v sredney troposfere dlya Severnogo polushariya)

PERIODICAL: Meteorologiya i gidrologiya, 1958, Nr 11, pp 3-10 (USSR)

ABSTRACT: The problems relative to a short-time forecast of meteorological elements on a hydrodynamic basis are solved by means of calculating machines for a limited part of the earth's surface only. If one has to solve, however, a nonlinear prognostic problem for the entire globe or for the northern hemisphere at least, it is not necessary to set up certain limiting conditions at the edges of a confined zone which do not agree with the physical task. To extend the forecast zone until it covers the range of one hemisphere becomes necessary also if one wishes to pass to forecasts for several days. Several variants of solution of this problem are furnished by Blinova (Ref 2). The present paper furnishes a practical scheme of computation together with examples. From the equation of Blinova (1) the author comes to the determination of the value S(0) by means of equation (7). S(0) determines the ratio of the vortex advection to the pres-

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On the Predetermination of Pressure in the Medium Troposphere of the Northern Hemisphere

sure variations at the pole in the vicinity of the pole. To apply the formulae mentioned above, one has to be in a position to determine the initial distribution of the current function $\psi(\theta,\lambda)$. If the initial geopotential field $\Phi(\theta,\lambda)$ is known, this can be done with one degree of accuracy or the other. For this purpose, the most simple relations (8) are used. At last, the author arrives at the final formulas of computation (9) - (13). The order of computation according to these formulae is mentioned. To solve the problem the large electronic computer of the AS USSR (BESM) with a specially composed program was used. As initial values the altitude of isobaric surfaces of 700 mb were used. In order to check the numerical solution, the program was first used to solve a problem where the result of the equation for vortex transfer (1) was exactly known. In a similar manner, the assumed numerical solution of Poisson's equation was verified. Subsequently, several examples of forecasts of the Northern hemisphere's isobaric charts were computed for each single day in advance. According to the initial

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On the Predetermination of Pressure in the Medium Troposphere of the Northern Hemisphere

map (Fig 2) AT_{700} 03^h, May 4, 1957, a number of forecast maps for several later periods such as 24, 36, 48, 72, 96 hours, etc were computed. Figure 3 shows one of these maps for 03^h of May 6, 1957, i.e. 49 hours in advance. Figure 4 shows the actual map for the latter period. A comparison of these two latter maps shows that a number of transformations in the baric field have been satisfactorily represented by the results of computation. So the map furnishes certain indications of a transition from South-West currents to South currents over the Northern half of the European USSR as well as of an intensification of Northern currents over the middle part of Siberia. In this connection, the calculated synoptic chart of future conditions together with the initial synoptic map made a correct forecast possible for a continuously warm, somewhat cloudy weather with scattered thunderstorms for the European USSR 48 hours in advance. For Siberia intensified north winds, a slight cooling and torrential rains could be forecast, which actually occurred 48 hours after the forecast had been made.

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On the Predetermination of Pressure in the Medium Troposphere of the Northern Hemisphere

Calculating after the scheme proposed is quick enough to use the results obtained in the course of the current prognostic work for several days. There are 4 figures and 2 Soviet references.

Card 4/4

BELOUSOV, S.L.

Studying errors in the numerical solution of the equation of vortex transfer on the mean level of the atmosphere. Trudy TSIP no.78:73-82 '58. (MIRA 12:2)

(Weather forecasting)

AUTHORS: Blinova, Ye. N., Corresponding Member AS USSR SOV/20-120-2-15/63
Belousov, S. L.

TITLE: Non-Linear Non-Steady Problem of the Determination of the Planetary Flow Pattern at the Midlevel of the Atmosphere (Nelineynaya nestatsionarnaya zadacha opredeleniya poley davleniya planetarnogo masshtaba na srednem urovne atmosfery)

PERIODICAL: Doklady Akademii nauk SSSR, 1958, Vol. 120, Nr 2, pp. 281 - 284 (USSR)

ABSTRACT: In 1943 one of the authors of this paper recommended a hydrodynamic method for the long-term forecast of pressure fields and the flow lines at atmospheric midlevel. An equation for the vortex (a simplified equation by A.A.Frieman) and one of the Euler (Eyler) equations were used for solving this problem. This aim was achieved by a linearization of the equations with respect to west-east transfer. The solution of the non-linear problem of long-term weatherforecast by the methods of hydrodynamics was facilitated by electronic computers. The most simple solution is obtained for the midlevel of the atmosphere. Some variants of such a solution were suggested in 1954. In this paper the methods

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and some results of the application of one of these variants are discussed. The equation for the flow function can be used as the initial equation, as was done previously:

$$\Delta \frac{\partial \psi}{\partial t} + \frac{1}{a_o^2 \sin \theta} (\psi, \Delta \psi) + 2\omega \frac{\partial \psi}{\partial \lambda} = 0,$$ where a_o and ω denote the radius and the angular velocity respectively of the earth. Further, the equation

$$\frac{\partial \psi}{\partial t} = - \frac{1}{4\pi a_o^2} \int_0^{2\pi} \int_0^{\pi/2} \ln \frac{1 - \cos \chi}{1 - \cos \bar{\chi}} \left[(\psi, \Delta \psi) + 2\omega a_o^2 \sin \theta' \frac{\partial \psi}{\partial \lambda'} \right]$$

$\cdot d\theta' d\lambda'$ holds.

Let the function ψ be known. The forecast of the values of ψ can be achieved by means of time steps in the computation. Computation is discussed in short. The authors also make a few suggestions for the performance of this computation by means of electronic computers. The problem under discussion was carried

Non-Linear Non-Steady Problem of the Determination of SOV/20-120-2-15/63
Planetary Flow Pattern at the Midlevel of the Atmosphere

out with the BECM (Bol'shaya elektronnaya schetnaya mashina AN SSSR)(great electronic computer of the AS USSR). Examples concerning the forecast of the absolute topography of the 700 millibar surface covering periods of up to 10 days are computed. One of these examples is illustrated by three figures. There are 3 figures and Soviet references.

ASSOCIATION: Tsentral'nyy institut prognozov (Central Institute of Weather Forecast)

SUBMITTED: February 14, 1958

1. Planetary atmospheres--Theory 2. Weather forecasting
3. Mathematics--Applications

Card 3/3

BELOUSOV, S.L.

Geopotential forecasts in the Northern Hemisphere in case of a baroclinic atmosphere. Trudy TSIP no.93:25-34 '60. (MIRA 13:11)
(Weather forecasting)

BELOUSOV, S.L.

Numerical pressure forecast at a mean atmospheric level for the Northern Hemisphere. Trudy TSIP no.106:65 '60. (MIRA 13:12)
(Atmospheric pressure)

30?4?

3,5100 (2205)

S/546/61/000/111/001/002
E032/E414

AUTHORS: Belousov, S.L., Boldyrev, V.G.

TITLE: On the forecasting of the geopotential in the upper atmosphere

SOURCE: Moscow. Tsentral'nyy institut prognozov. Trudy. no.111. 1961. Voprosy dinamicheskoy meteorologii, 3-12

TEXT: In the first part of this paper, the authors put forward a method for the short-range forecasting of the geopotential in the upper atmosphere. The effect of the lower-lying levels is taken into account by formulating the corresponding boundary conditions at the lower boundary of the region under investigation. The problem is solved for the layer which lies above the mean level of the atmosphere. The latter is identified with a certain isobaric surface (for example 700 mb). The geopotential of the mean level is looked upon as a known function of time, which is found independently of the forecast for the mean level, as described by Ye.N.Blinova (Ref.1: Hydrodynamic Theory of Pressure Waves. Temperature Waves and Centres of Atmospherical Activity, DAN SSSR, v.39, no.7, 1943). The forecast is based on the

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following formula (Ref.4: Kibel', I.A., Introduction to hydrodynamic methods of weather forecasting, GTTI, M. 1957)

$$\Delta q + \frac{\partial}{\partial \zeta} \zeta^2 \frac{\partial q}{\partial \zeta} = F, \tag{1}$$

where

$$q = \frac{\partial H}{\partial t}; \quad F = -\frac{c^2}{lg} A_\Omega + \frac{R}{g} \frac{\partial}{\partial \zeta} (\zeta A_T),$$

and

$$A_\Omega = \frac{g^2}{l^2} (H, \Delta H) + \beta \frac{g}{l} \frac{\partial H}{\partial x} \qquad A_T = -\frac{\gamma}{R} \frac{g^2}{l} \left(H, \frac{\partial H}{\partial \zeta}\right)$$

The quantity ζ serves as the vertical coordinate and is equal to the ratio of the pressure at the particular level to the standard pressure at sea level. The horizontal coordinates are the dimensionless quantities x and y, the unit of length being c/l where l is the Coriolis parameter and $c2 = R/g(\gamma_a - \gamma)RT$ (assumed constant). The Laplace operator Δ and the Jacobian (A, B) are taken in terms of the variables x, y. The boundary conditions for ζ are

$$\zeta \to 0 \quad \zeta \frac{\partial q}{\partial \zeta} < \infty; \tag{2}$$

$$\zeta = \zeta_0 \quad q = q_0(x, y, t), \tag{3}$$

where the subscript o refers to the mean level of the atmosphere and q_o is a known function of time. It is shown that the solution is given by

$$q = q_0 + \frac{1}{2\pi}\frac{c^2}{lg}\int_0^1 \iint_{-\infty}^{\infty} (A_\Omega - A_{\Omega_0}) G_\Omega \, dx'\, dy'\, d\xi' - \tag{8}$$

where

$$-\frac{1}{2\pi}\frac{R}{g}\int_0^1 \iint_{-\infty}^{\infty} A_T G_T \, dx'\, dy'\, d\xi', \tag{9}$$

$$G_\Omega = \frac{1}{2\sqrt{\xi\xi'}} \sigma(a, r) \Bigg|_{a = \ln\frac{1}{\xi\xi'}}^{a = \left|\ln\frac{\xi}{\xi'}\right|}; \quad G_T = -\xi' \frac{\partial G_\Omega}{\partial \xi'}.$$

$$\sigma(a, r) = \frac{e^{-\frac{1}{2}\sqrt{a^2+r^2}}}{\sqrt{a^2+r^2}};$$

$$r^2 = (x-x')^2 + (y-y')^2.$$

The second part of the paper is concerned with the setting up of a program so that the solution given by Eq.(8) can be evaluated numerically with the aid of a computor. The integrals in Eq.(8) are computed by the method described by I.A.Kibel' (Ref.4). The technical details and the results of preliminary experiments are not given but the final formulas used in the forecast are reproduced. The final section reports preliminary results of the calculations. Fig.3 shows a typical result (a- original distribution for February 2, 1954 at 18 hours; б - actual distribution for February 3, 1954 at 18 hours; в - the predicted distribution for February 3, 1954 at 18 hours). The scheme now reported is stated to be the first step in the development of forecasting methods for the upper atmosphere. It is possible to improve this scheme within the framework of the quasi-geostrophic

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On the forecasting of ...

approximation. Thus, one must take into account the planetary boundary layer which exists in the stratosphere (Ref.4). The associated baroclinic effects will require a more detailed description of the vertical structure of the upper atmosphere. The difference between the static stability parameters in the troposphere and stratosphere must also be taken into account. A.D.Chistyakov, N.I.Buleyev, G.I.Marchuk and A.M.Obukhov are mentioned in the article for their contributions in this field. There are 5 figures, 2 tables and 6 Soviet-bloc references.

4

Card 5/7

ZAVARINA, Mariya Vasil'yevna; YUDIN, Mikhail Isaakovich. Prinimali uchastiye: DMITRIYEVA-ARRAGO, L.R.; LOBANOVA, V.Ya.; BELOUSOV, S.L.; ZELIKOVSKIY, V.E.; POKROVSKAYA, T.V., otv. red.; GONDIN, L.S., otv. red.; VLASOVA, Yu.V., red.; IVKOVA, G.V., tekhn. red.

[Calculating machines and their use in meteorology and climatology] Schetnye mashiny i ikh ispol'zovanie v meteorologii i klimatologii. Leningrad, Gidrometeor. izd-vo, 1963. 263 p. (MIRA 17:3)

BELOUSOV, S.L.

Practice in the operative precomputation of upper-air baric maps of three levels. Trudy TSIP no.126:3-7 '63. (MIRA 16:11)

BELOUSOV, S.L., kand.fiz.-matem.nauk

Use of numerical methods of forecasting in operational practice of meteorological services in foreign countries. Meteor. i gidrol. no. 10:38-44 O '64. (MIRA 17:10)

1. Mirovoy meteorologicheskiy tsentr.

USPENSKIY, B.D., doktor fiz.-mat. nauk, prof.; BELOUSOV, S.L., kand. fiz.-mat. nauk; PYATYGINA, K.V.; YUDIN, M.I.; MERTSALOV, A.N., kand. fiz.-mat. nauk; DAVYDOVA, O.A.; KUPYANSKAYA, A.P.; PETRICHENKO, I.A.; MORSKOY, G.I.; TOMASHEVICH, L.V.; SAMOYLOV, A.I.; ORLOVA, Ye.I.; DZHORDZHIO, V.A.; PETRENKO, N.V.; DUBOVYY, A.S.; ROMOV, A.I.; PETROSYANTS, M.A.; GLAZOVAYA, [illegible] BATYAYEVA, T.F.; BEL'SKAYA, N.N.; CHISTYAKOV, A.D.; GANDIN, L.S.; BURTSEV, A.I.; MERTSALOV, A.N.; BAGROVYY, N.A.; BELOV, P.N.; ZVEREV, A.S., retsenzent; SIDENKO, G.V., [illegible] red.; DUBENTSOV, V.R., kand. fiz.-mat. nauk, nauchn. red.; SAGATOVSKIY, N.V., red.; BUGAYEV, V.A., doktor geogr. nauk, prof., red.; ROGOVSKAYA, Ye.G., red.

[Manual on short-range weather forecasts] Rukovodstvo po kratkosrochnym prognozam pogody. Leningrad, Gidrometeoizdat. Pt.1. Izd.2., perer. i dop. 1964. 519 p. (MIRA 18:1)

1. Moscow. TSentral'nyy institut prognozov.

BELOUSOV, S.L.

Experience in using the automatic processing of aerological telegrams for numerical operative forecasting. Trudy MMTS no.10:3-7 '65. (MIRA 19:1)

BELOUSOV, S.L.

Automation of processing operative information of aerological stations of the U.S.S.R. Trudy MMTS no.7:3-8 '65. (MIRA 18:7)

L 36095-66 EWT(1) JXT(CZ /CW
ACC NR: AT6014297 (N) SOURCE CODE: UR/3118/65/000/010/0003/0007

AUTHOR: Belousov, S. L.

ORG: none

TITLE: A test of the application of automatic processing of aerological telegrams for a numerical operational forecast

SOURCE: Mirovoy meteorologicheskiy tsentr. Trudy, no. 10, 1965. Ob"yektivnyy analiz i obrabotka meteorologicheskikh dannykh (Objective analysis and processing of meteorological data), 3-7

TOPIC TAGS: data processing system, data recording, data storage, weather forecasting, computer input unit, data transmission, automation, automatic control technology

ABSTRACT: The World Meteorological Center in the Soviet Union has worked on the weakest link in the automatic handling of weather forecasting--the processing of the initial information for feeding computers. The automation of the input process both speeds the forecasting and increases the data control by allowing more data to be handled. The proposed system is only a partial solution since it uses a photo-transmitter to feed the data from telegraphic punched tape to machine. To provide automatic detection and storage of the data two new blocks were added to the actuating program: one block provides accumulation of the decoded telegram; the other block

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separates out from the stored information the data necessary for the appropriate analysis and arranging of these data in a sequence satisfying the station analysis dictionary. Information from all northern hemisphere weather reports, including radio-probes (with the exception of marine stations), is accepted, and the system includes techniques for overcoming distortions, messages varying from the standard, etc. The data with address added are stored on a magnetic drum for retrieval of sections as needed. In one test data from 140 SSSR radio-probes (3840 words of 45 bits stored on one tape) were handled as follows: input from tape--35 sec; separation into groups--40 sec; detection, decoding, and recording--25 sec. A test forecast using standard analysis proved the system workable, and future improvements will include accepting marine reports and fully automating the communication channel to machine input process. The author thanks Ye. N. Arabey and G. D. Basova of the Numerical Operational Forecast Division of MMTs for preparation and analysis of the results and E. A. Nizhnikov, B. G. Buravtsev, and V. P. Tkachuk, engineers of the Computer Division of MMTs, for work on the photo input device.

SUB CODE: 04, 09/ SUBM DATE: none/ ORIG REF: 004

Card 2/2

ACC NR: AP7004585 SOURCE CODE: UR/0050/66/000/008/0003/0011

AUTHOR: Bugayev, V. A. (Academician AN UzSSR); Belousov, S. L. (Candidate of physicomathematical sciences)

ORG: Hydrometeorological Scientific Research Center SSSR (Gidrometeorologicheskiy nauchno-issledovatel'skiy tsentr SSSR)

TITLE: Numerical methods of weather forecasting in the work of the USSR Hydrometeorological Service

SOURCE: Meteorologiya i gidrologiya, no. 8, 1966, 3-11

TOPIC TAGS: weather forecasting, weather map

ABSTRACT: Numerous articles on numerical forecasting appear in the Soviet meteorological literature, but those deal mostly with the theoretical aspects and no good studies have appeared indicating exactly to what extent numerical weather forecasting is actually used. As a result, the authors complain that too little is known of how widely numerical forecasting actually is being used. The article cited below fills this gap. For example, long-range mean monthly temperature anomalies are predicted for the northern hemisphere on the basis of the precomputed circulation in the middle troposphere and taking into account the principal climate-forming factors. The forecasts are prepared in the Section on Planetary Atmospheric Dynamics and Hydrodynamic Long-Range Forecasts of the Hydrometeorological Center USSR monthly, 40 days in advance. The same section

Card 1/2 UDC: 551.509.313

ACC NR: AP7004585

routinely prepares long-range (up to 6 days in advance) forecasts of the AT700 and AT300 charts for the northern hemisphere using a two-level model. Three times a week the pressure field for the northern hemisphere is predicted using a three-level model; this includes forecasting of the surface, AT700 and AT500 charts for up to 5 days in advance. In fact, up to 50 different charts are prepared daily and some of them, on an experimental basis, are being drafted directly onto blanks by a special attachment to a computer. Most of the charts are disseminated to the field at once. A map is shown which indicates regions for which short-range forecasts is made. Table 1 is exceptionally valuable: it gives the forecasting models used, the initial data employed for each such model, the region for which the forecast is prepared, the number of hours required for producing a chart, computer time required, type of forecast, and frequency with which the forecast is prepared. All forecasts are evaluated to determine their success and analyze reasons for inaccuracies. Comparable charts from other countries are compared for evaluating the successes of Soviet meteorologists in comparison with those of other countries. The exchange of charts between Washington and Moscow is discussed briefly. Numerical forecasting work at the Novosibirsk, Tashkent, Leningrad and Rostov-on-Don weather bureaus is described. A special section deals with the numerical forecasting objectives of Soviet meteorologists in both long- and short-range forecasting. Orig. art. has: 1 figure and 4 tables. [JPRS: 38,460]

SUB CODE: 04 / SUBM DATE: 01Apr66

Card 2/2

VOGRALIK, V.G., prof., red.; BELOUSOV, S.M., red.; BOL'SHEV, I.N., red.; KLIMOVA, N.Ya., red.; KOROLEV, B.A., red.; YASHANIN, Yu.V., red.

[Problems in the pathology and treatment of blood system diseases] Voprosy patologii i terapii sistemy krovi. Gor'kii, 1961. 197 p. (MIRA 14:12)

1. Gospital'naya terapevticheskaya klinika Gor'kovskogo meditsinskogo instituta im. S.M.Kirova i Gematologicheskoy kliniki pri Oblastnoy stantsii perelivaniya krovi (for Vogralik). 2. Gor'kovskaya oblastnaya stantsiya perelivaniya krovi (for Bol'shev, Klimova, Yashanin). 3. Klinika gospital'noy khirurgii Gor'kovskogo meditsinskogo instituta im. S.M.Kirova (for Korolev).
(BLOOD--DISEASES)

DROZDOV, N. A., doktor sel'skokhozyaystvennykh nauk, prof.; BELOUSOV, S. M.

Use of succinic acid in agriculture. Biul. tekh.-ekon. inform. Gos. nauch.-issl. inst. nauch. i tekh. inform. no.12:23-27 '62. (MIRA 16:1)

(Succinic acid)
(Agricultural chemistry)

APPROVED FOR RELEASE: 06/23/11: CIA-RDP86-00513R000204400030-6

BELOUSOV, Semen Nikolayevich; ALEKSEYEV, G.P., inzh., red.; GUTMAN, I.M., inzh., red.; KUZ'MOV, N.T., inzh., red.; FEDOROV, N.G., kand.tekhn. nauk, red.; IGNAT'YEV, M.G., agronom, red.; PICHAK, F.I., kand. tekhn.nauk, red.; POLKANOV, I.P., kand.tekhn.nauk, red.; MARCHENKOV, I.A., tekhn.red.

[Machines for the reclamation of new lands] Mashiny dlia razrabotki novykh zemel'. Moskva, Gos.nauchno-tekhn.izd-vo mashinostroit. lit-ry, 1960. 69 p. (MIRA 13:7)
(Reclamation of land)

SOV/68-59-4-17/23

AUTHORS: Bolotin, Ya.S. and ~~Belousov, G.P.~~

TITLE: On the Operation of Combustion Chambers on the Khanzhenkovo Coking Works (O rabote kamer dozhiganiya na Khanzhenkovskom koksokhimicheskom zavode)

PERIODICAL: Koks i Khimiya, 1959, Nr 4, pp 56-60 (USSR)

ABSTRACT: On the above works the carbonisation of pitch is carried out without collection of the volatile products which were let into the atmosphere causing excessive air pollution. As a preventative measure special combustion chambers were built on the path of the waste gas from the main flue to the stack of the battery. The design and operation of these combustion chambers is designed and illustrated (fig 1 to 4). The distribution of temperatures and draught along the path of waste gases is given in tables 1 and 2 respectively. The above measure considerably decreased the atmospheric pollution and is recommended for other works operating

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SOV/68-59-4-17/23

On the Operation of Combustion Chambers on the Khanzhenkovsk Coking Works

without the collection of volatile carbonisation products. There are 4 figures and 2 tables.

ASSOCIATION: Teplotekhstantsiya; and Khanzhenkovskiy Koksokhimicheskiy Zavod (Khanzhenkovo Coking Works)

Card 2/2

BELOUSOV, S.P., insh. (Stalinskaya oblast USSR); DUN, A.S. (Stalinskaya oblast USSR); NIKBERG, I.I., sanitarnyy vrach (Stalinskaya oblast' USSR)

Use of a series of chambers for the complete combustion of industrial gases before discharge into the air. Gig. i san. 24 no.4:70-71 Ap '59. (MIRA 12:7)

(AIR POLLUTION, purification, serial burning chambers in indust. (Rus))

Belousov, S.P.

10 июня

(с 10 до 16 часов)

Ю. К. Муравьев

Новый метод приближенного решения интегрального уравнения теории антенн.

В. И. Таланов

К вопросу о возбуждении диэлектрических волноводов.

О. Г. Вендик

Синтез линейки излучателей с немеханическим качанием луча.

10 июня

(с 18 до 22 часов)

Г. Х. Фридман

Фокусирующие свойства дифракционных отражателей (решеток).

А. Н. Чижов

Метод измерения коэффициента направленного действия антенн на малых расстояниях.

Б. С. Надененко,
И. А. Гусятинский

Влияние условий распространения на антенны, работающие на линиях, использующих дальнее рассеяние радиоволн в тропосфере.

С. П. Белоусов

Антенна бегущей волны для приема средних волн.

В. Д. Кузнецов,
А. И. Воронович

Система многократного использования сложных коротковолновых антенн.

11 июня

(с 10 до 16 часов)

Н. С. Михайлов

Дифракция электромагнитных волн на конце спиральной линии.

В. С. Ильин

Расчет многоканального волноводного делителя мощности.

В. И. Васильев

О статистических характеристиках коэффициента отражения волны в случайно неоднородных линиях передачи.

report submitted for the Centennial Meeting of the Scientific Technological Society of Radio Engineering and Electrical Communications im. A. S. Popov (VNORiE), Moscow, 8-12 June. 1959

9.1000

77176
SOV/108-15-1-2/13

AUTHORS: Belousov, S. P., Yampol'skiy, V. G.

TITLE: Traveling Wave One-Wire Antenna for Reception of Medium Waves

PERIODICAL: Radiotekhnika, 1960, Vol 15, Nr 1, pp 16-25 (USSR)

ABSTRACT: The paper presents a method of engineering computation of a one-wire wave antenna (beverage antenna), and gives some results of calculation. Assuming the wavelength $\lambda > 200$ m, a simplified expression for the propagation constant is derived from the first approximation of an exact expression given in previous Soviet publications. This simplified expression coincides with that obtained by D. Carson and W. Wise (see U.S. references) and is defined as:

$$\frac{\gamma}{i\kappa} = 1 - \frac{1}{\kappa_2^2 \ln \frac{2h}{a}} \int_0^\infty \left(\sqrt{\nu^2 + \kappa^2 - \kappa_2^2} - \nu\right) e^{-2h\nu}\, d\nu. \qquad (2)$$

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Here, $\gamma = B + ia$ is constant of wave propagation in the wire; k equals $2\pi/\lambda$; λ is wavelength in meters; k_2 is constant of wave propagation in the ground and equals $K\sqrt{\varepsilon - 160\lambda\sigma}$, ε being relative dielectric constant of the ground, and σ ground conductivity in mho/m; h is height of the antenna suspension and a is the wire radius. Equation (2) is transformed into Eq. (4):

$$\frac{\alpha}{\kappa} - i\frac{\beta}{\kappa} = 1 - i\frac{R}{\ln\frac{2h}{a}}, \qquad (4)$$

where

$$R = \frac{1}{s^2}\int_0^\infty \left(\sqrt{w^2 + is^2} - w\right)e^{-rw}\,dw,$$

$$s = \sqrt{1 + \frac{i(\varepsilon - 1)}{60\lambda\sigma}} = te^{i\psi}, \quad r = 12{,}6\,\frac{h}{\lambda}\sqrt{60\lambda\sigma}.$$

Traveling Wave One-Wire Antenna for Reception of Medium Waves

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Introducing two integration intervals (from 0 to t and from t to ∞) and applying to the expression $\sqrt{w^2 + is^2}$ the Maclaurin series expansion, an approximate solution for R is obtained with an accuracy of 5-10%. Using this expression and Eq. (4), the relationship between $\alpha/k = c/v$ and is represented graphically for a wire of 3-mm diameter and for various values of h; here c is velocity of light and v is phase velocity in the wire. A graphic is given also for the relationship between β/k and λ for the same values of h. In both cases, humid and dry ground were taken into consideration. From the plotted curves the following conclusions are drawn: (1) In the medium wave range the magnitude of the propagation constant depends essentially on the ground parameters; the lower above ground the wire suspension, the stronger the dependence. (2) Dry ground has the greatest effect on the propagation constant. (3)

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Traveling Wave One-Wire Antenna for Reception of Medium Waves

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The effect of humid ground on the propagation constant may be neglected for h > 5 m. Expressions are given for the radiaton pattern of the wave antenna. A number of graphs represent the radiation pattern for antennas of length L = 1,000, 2,000, and 3,000 m, and for λ = 200, 400, 800, and 1,000 m. It is seen from the radiation patterns in a vertical plane of the antenna axis that the directional properties of wave antennas suspended over humid ground are better than those of antennas over dry ground. Expressions (13) and (14) are given for parameters D and D' characterizing the noiseproof feature of the antenna. The expression for D' characterizes the noiseproof feature during the day-time when only surface waves are received.

$$D = \frac{4\pi}{3\int_0^{2\pi} d\varphi \int_0^{\frac{\pi}{2}} F^2(\Delta, \varphi)\cos\Delta\, d\Delta}$$

$$D' = \frac{2\pi}{\int_0^{2\pi} F^2(\varphi)\, d\varphi}.$$

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Traveling Wave One-Wire Antenna for Reception of Medium Waves

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Here Δ is angle of elevation; φ is azimuth angle; $F(\Delta, \varphi)$ is the radiation pattern. D' was calculated using numerical integration of radiation patterns. From the plotted results it may be seen that for λ = 200-2,000 the length L of the antenna should not exceed 3,000 m, because in this case the values of D' diminish within the range of shorter waves. Expressions for the amplification coefficient of the wave antenna are given for the sky wave and the surface wave. They contain the factor g(L) which depends on the antenna length L as shown by Eq. (18):

$$g(L) = |e^{-\beta L + ikL(k_1 - \cos\Delta)} - 1|. \tag{18}$$

where k_1 equals $\alpha/k = c/v$. It may be seen that an optimum antenna length L_{opt} may be obtained. An approximate formula for L_{opt} is derived from the maximum condition for g(L). There are 11 figures; and 6 references, 4 Soviet, 2 U.S. The U.S. refe-

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Traveling Wave One-Wire Antenna for Reception of Medium Waves

77176
SOV/108-15-1-2/13

ences are: D. Carson, BSTJ Nr 10, 1926; W. Wise, PIRE Nr 4, 1934.

SUBMITTED: April 11, 1958

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BELOUSOV, S.P.; YAMPOL'SKIY, V.G., otv. red.; VORONOVA, A.I., red.;
MARKOCH, K.G., tekhn. red.

[Directional antennas for radio reception in the range from 200 - 2000 meters] Napravlennye antenny dlia professional'-nogo priema radioveshchaniia v diapazone 200 - 2000 m. Moskva, Gos. izd-vo lit-ry po voprosam sviazi i radio, 1961. 71 p.
(MIRA 14:9)

(Radio—Antennas)

APPROVED FOR RELEASE: 06/23/11: CIA-RDP86-00513R000204400030-6

9.1910 (also 2603)

21204
S/111/61/000/004/001/001
B107/B202

AUTHORS: Belousov, S. P., Candidate of Technical Sciences, Senior Scientific Worker (see Association), Shergin, N. N., Senior Engineer

TITLE: Mutual influence of rhombic aerials located at a common point

PERIODICAL: Vestnik svyazi, no. 4, 1961, 6-8

TEXT: Already M. S. Gartsenshteyn and A. S. Golubchik have studied the mutual influence in an aerial assembly consisting of two separate rhombic aerials of the type РГ $\frac{65}{4}$1.0 (RG$\frac{65}{4}$1.0), and in an aerial assembly consisting of two double rhombic aerials of the type РГД $\frac{65}{4}$1.0 (RGD$\frac{65}{4}$1.0) ("Rhombic aerials, located at a common point", Vestnik svyazi, no. 4, 1949). These measurements have been made, however, only in a narrow range of wavelengths and with a small distance between aerial and receiver (19 m) as compared with the largest dimension of the rhombic

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aerial (10.5 m). These measurements were repeated to work out definite recommendations for the use of rhombic aerials on common poles. Besides, the mutual influence of aerial assemblies of the type РГ $\frac{70}{6}$1.25 (RG$\frac{70}{6}$1.25) with RG$\frac{65}{4}$1.0 and of the type РГД $\frac{70}{6}$1.25 (RGD$\frac{70}{6}$1.25) with RGD$\frac{65}{4}$1.0 was studied. The measurements were made with decimeter models with a model factor of 50. The receiver was fastened to a vertical pole at a distance of 90 m; the mutual influence of the rhombic aerials with different angles of suspension φ(5^o, 10^o, 15^o) could be determined. The measurement results are given in $\varepsilon_H / \varepsilon_0$. ε_0 is the value of the amplification factor in the case of independent suspension, ε_H for central suspension with a passive aerial. The following aerial assemblies were studied: 1) aerial RG$\frac{65}{4}$1.0 (optimum wave λ_{01}) with aerial RG$\frac{65}{4}$1.0 (optimum wave $\lambda_{02} = 2\lambda_{01}$) (Fig. 1); 2) aerial RG$\frac{70}{6}$1.25 (optimum wave

λ_{01}) with aerial RG$\frac{65}{4}$1.0 (optimum wave λ_{02} = 2.2 λ_{01})(Fig. 2); 3) aerial RGD$\frac{65}{4}$1.0 (optimum wave λ_{01}) with aerial RGD$\frac{65}{4}$1.0 (optimum wave λ_{02} = 2 λ_{01})(Fig. 3); 4) aerial RGD$\frac{70}{6}$1.25 (optimum wave λ_{01}) with aerial RGD$\frac{65}{4}$1.0 (optimum wave λ_{02} = 2.2 λ_{01}) (Fig. 4); 5) aerial RG$\frac{65}{4}$1.0 (optimum wave λ_{02} = 2 λ_{01}) with aerial RG$\frac{65}{4}$1.0 (optimum wave λ_{01})(Fig. 5); 6) aerial RG$\frac{65}{4}$1.0 (optimum wave λ_{02} = 2.2 λ_{01}) with aerial RG$\frac{70}{6}$1.25 (optimum wave λ_{01}) (Fig. 6); 7) aerial RGD$\frac{65}{4}$1.0 (optimum wave λ_{02} = 2 λ_{01}) with aerial RGD$\frac{65}{4}$1.0 (optimum wave λ_{01}) (Fig. 7); 8) aerial RGD$\frac{65}{4}$1.0 (optimum wave λ_{02} = 2.2 λ_{01}) with aerial RGD$\frac{70}{6}$1.25 (optimum wave λ_{01}) (Fig. 8). With an optimum wave λ_{01}, reception is considerably weaker,

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especially for angles of suspension corresponding to a low radiation of the aerial (Figs. 1-4). For angles of suspension which lie in the sector of the major lobe, impairment between λ/λ_0 = 0.7-1.6 is insignificant. Hence, the directional characteristic of two centrally suspended rhombic aerials is somewhat distorted. When working on the optimum wave λ_{02} reception is not essentially impaired (Figs. 5-8). On the basis of the experimental results obtained, the authors conclude that in special cases the central suspension of two rhombic aerials is possible, one of which is intended for day-time operation the other for night-time operation. There are 8 figures and 1 Soviet-bloc reference.

ASSOCIATION: NII Ministerstva svyazi SSSR (Scientific Research Institute of the Ministry for Communications USSR)

Mutual influence of rhombic ...

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B107/B202

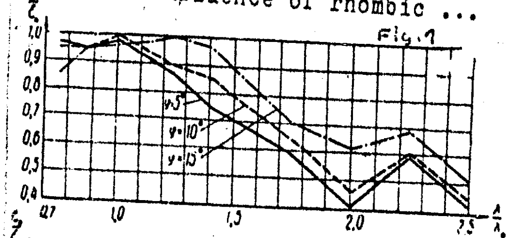

Fig.1

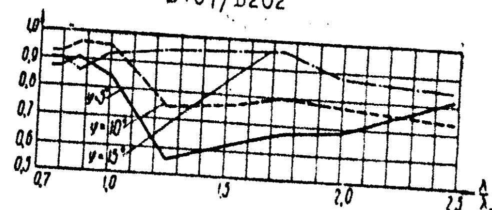

Fig.2

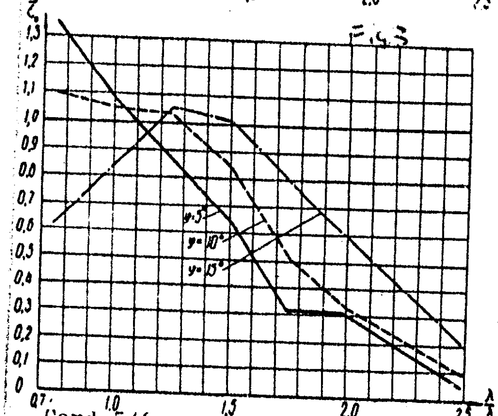

Fig.3

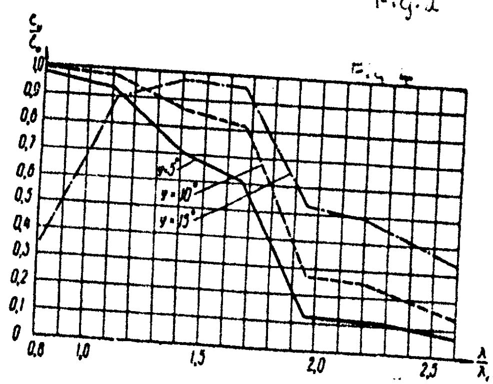

Fig.4

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Mutual influence of rhombic ...

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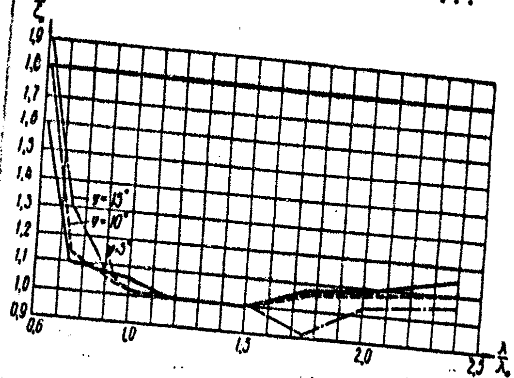

Fig 5

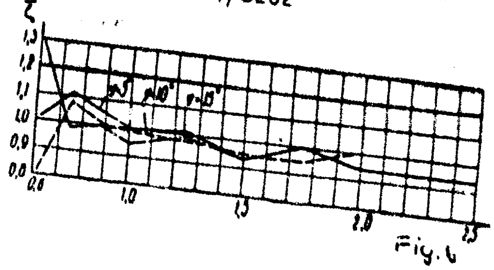

Fig. 6

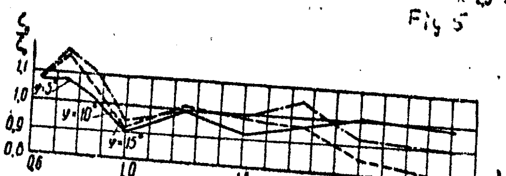

Fig. 7

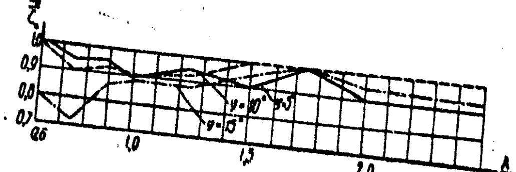

Fig. 8

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S/108/61/016/012/003/009
D201/D302

AUTHORS: Ayzenberg, G.Z., Belousov, S.P., Lindeberg, A.Kh., and Yampol'skiy, V.G., Members of the Society, (See Association)

TITLE: An anti-fading broadcast antenna

PERIODICAL: Radiotekhnika, v. 16, no. 12, 1961, 21-30

TEXT: In the present article, the authors describe an antenna designed so as to have anti-fading properties within a wide frequency band. The antenna is based on the wide-band anti-fading antenna with controlled current distribution as suggested by G.Z. Ayzenberg in 1939 (Ref. 1: Elektrosvyaz', no. 9, 1940) (Ref. 3: Author's certificate No. 71603 of December 12, 1948). Controlled current antennae, described recently in foreign literature are designed around the Ayzenberg principle, but are not designed for wide band operation. The antenny described is based on the extended band width 200-2000 m. range antenna as shown on Fig. 2. It consists of the mast 1 insulated from earth. The screening of the

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An anti-fading ...

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feeder 2 is extended up to height H_1 around the antenna mast. The current in the antenna is controlled by means of a variable impedance in the form of a s.c. stub, connected between the earth and the lower end of the screening. The s.c. stub is actually the outer sheath 3 of the feeder. By changing the length of the s.c. line from 0 to $\lambda/2$, the input resistance varies from $-\infty$ to $+\infty$. The reactance is controlled by moving the s.c. stub to earth 4. To decrease surface losses - a thick wire mesh is placed under the stub 3. Matching is either by a distributed or a lumped constant transmission line. The main dimensions have been chosen for the antenna to have anti-fading properties in the 200-550 m. band. The height of the antenna should not exceed 220-230 m, although to increase the band width it has actually been increased to 257 m, the height of screening H_1 corresponding then to 0.33 H. Increasing H_1 to 0.5 H increases the operating range down to 140 m with better anti-fading properties at 200-230 m. The characteristic impedance of the antenna depends on the transmitter power. The characteristic stub impedance W_s

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31209

An anti-fading ...

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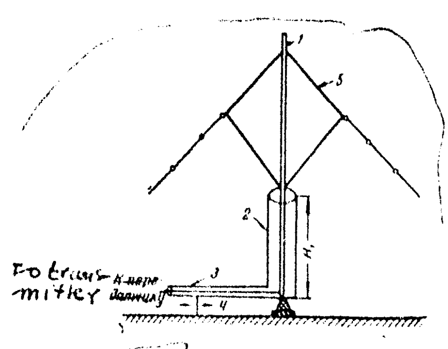
D201/D302

Society of Radio Engineering and Electrical Communications im. A.S. Popov) [Abstracter's note: Name of Association taken from first page of journal]

SUBMITTED: May 30, 1961



Card 4/4

Fig. 2

BELOUSOV, S.P., kand.tekhn.nauk, starshiy nauchnyy sotrudnik; SHERGIN, N.N., starshiy inzh.

Intercoupling between rhombic antennas located on the same platform. Vest. sviazi 21 no.4:6-8 Ap '61. (MIRA 14:6)

1. TSentral'nyy nauchno-issledovatel'skiy institut Ministerstva svyazi SSSR (for Belousov).

(Antennas(Electronics))

AYZENBERG, Grigoriy Zakharovich; Prinimali uchastiye: BELOUSOV, S.P.; YAMPOL'SKIY, V.G.; OLIFIN, L.K.; SHKUD, M.A.; KOCHERZHEVSKIY, G.N., otv. red.; SHEFER, G.I., tekhn. red.

[Shortwave antennas]Korotkovolnovye antenny. Moskva, Sviaz'-izdat, 1962. 814 p. (MIRA 15:9)

(Antennas (Electronics))

37571

9,1700

S/106/62/000/005/003/007
A055/A101

AUTHORS: Belousov, S.P.; Yampol'skiy, V.G.

TITLE: Two-wire traveling wave antenna

PERIODICAL: Elektrosvyaz', no. 5, 1962, 24 - 30

TEXT: In this article are examined the parameters of a short wave two-wire traveling wave antenna installed over a damp ground. The parameters of the medium wave and long wave antennas were discussed by the authors in an earlier work ["Dvukhprovodnaya antenna begushchey volny" ("Two-wire traveling wave antenna"), Sbornik NII Ministerstva svyazi, 1960, no. 2, (16)]. In the first part of the present article, the authors reproduce a formula giving the efficiency coefficient m as the ratio of the gain of a two-wire antenna to the gain of a single-wire antenna of the same length. They also reproduce a formula giving the radiation pattern of the two-wire antenna. In the second part of the article, they deal with the propagation constants of the current along the single-wire antenna ($\gamma_1 = d_1 - i\beta_1$) and the two-wire antenna ($\gamma_2 = d_2 - i\beta_2$). These constants are determined by the following expressions:

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$$\frac{\gamma_1}{\alpha} = 1 - \frac{R_1}{\ln \frac{2h}{\rho}} \quad (6), \quad \text{and} \quad \frac{\gamma_2}{\alpha} = 1 - \frac{R_2}{\ln \frac{2h}{\rho}}, \quad (7)$$

where h is the suspension height, ρ is the radius of the wire, and

$$R_1 = \frac{s^2}{\varepsilon'} \int_0^\infty w \frac{\sqrt{w^2 + p^2} - w}{w + \frac{1}{\varepsilon'}\sqrt{w^2 + p^2}} e^{-bw} dw, \quad (8)$$

$$R_2 = \frac{s^2}{\varepsilon'} \int_0^\infty w \frac{\sqrt{w^2 + p^2} - w}{w + \frac{1}{\varepsilon'}\sqrt{w^2 + p^2}} e^{-bw} \cos awdw, \quad (9)$$

where ε' is the complex permittivity of the ground, and $s = |\sqrt{1 - \varepsilon'}|$, (10)

$b = 2\alpha hs$ (11), $a = \alpha ds$ (12), $p = \frac{\sqrt{1 - \varepsilon'}}{s}$ $(|p| = 1)$ (13).

The authors describe a new method for computing the integrals in (8) and (9). These integrals, as computed by this method, give a more accurate formula for

Two-wire traveling wave antenna

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A055/A101

the calculation of the current propagation constant (in the short wave range) than the asymptotic formula deduced by Wise ("Propagation of high-frequency currents in ground return circuits", Proc. IRE, 1934, April). In the third part of the article, the authors present three graphs showing the dependence of the current attenuation constant upon the distance between the two wires for three different wavelengths. They also give graphs showing the phase velocity of the current. The analysis of the thus obtained data leads the authors to the conclusion that the efficiency coefficient m, characterizing the gain ensured by the use of a two-wire antenna, possesses the following properties:

$$\underset{\lambda \to 0}{m \longrightarrow} \frac{W_1}{W_2} \approx 2 \quad (25), \qquad \underset{\lambda \to \infty}{m \longrightarrow} \frac{W_1}{W_2} \approx 2 \quad (26)$$

W_1 and W_2 being, respectively, the wave impedances of a single-wire and a two-wire antenna. The efficiency of the two-wire antenna was also determined experimentally; the experimental results are in good agreement with the calculated ones. The Soviet personalities mentioned in the article are: G.Z. Ayzenberg, G.A. Grinberg and B.E. Bonshtedt. There are 9 figures and 8 references: 5 Soviet-bloc and 3 non-Soviet-bloc.

SUBMITTED: December 20, 1961

Card 3/3

BELOUSOV, S. P.

PHASE I BOOK EXPLOITATION SOV/6112

Ayzenberg, Grigoriy Zakharovich

Korotkovolnovyye antenny (Short-Wave Antennas). Moscow, Svyaz'izdat, 1962. 814 p. Errata slip inserted. 10,000 copies printed.

Resp. Ed.: G. N. Kocherzhevskiy; Tech. Ed.: G. I. Shefer.

PURPOSE: This monograph is intended for scientists and radio engineers concerned with the theory and design of short-wave transmitting and receiving antennas. It may also be useful as a textbook for students in advanced radio engineering courses in schools of higher education.

COVERAGE: The present work is a revised edition of a book by the same author, entitled "Antennas for Main Short-Wave Radio Communications," published in 1948. In the new book considerable progress in the field of short-wave antennas is taken into consideration, and the latest developments in antenna technique,

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such as cophasal band antenna arrays with parasitic reflectors, traveling wave antennas with pure coupling resistance, logarithmic antennas, and band shunt-fed vibrators, are described. The chapter on rhombic antennas is substantially expanded. A new chapter (XVI) dealing with single-wire traveling wave antennas is introduced. The fundamental problem of the interference immunity of various receiving antennas is discussed in an added chapter (XVII). Ch. XIII was written by S. P. Belousov; Chs. XIV and XV, by Belousov and V. G. Yampol'skiy; Ch. XVIII, by L. K. Olifin; and Sec. 4 of Ch. XIX, by M. A. Shkud. The graphs for calculating mutual impedance in balanced vibrators of arbitrary dimensions were compiled under the supervision of Belousov. The author thanks the coauthors and L. S. Tartakovskiy, Ye. G. Pol'skaya, V. G. Ezrin, I. T. Govorkov, and G. N. Kocherzhevskiy. There are no references.

TABLE OF CONTENTS:

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